3 RECOVERY GOALS, OBJECTIVES, AND CRITERIA

In general, the goal of ESA recovery planning is to restore the listed species to the point that it is again a self-sustaining element of its ecosystem and it no longer needs the protection of the Act – and it can be delisted. Recovery plans may also contain "broad-sense goals" that may go beyond the requirements for delisting to acknowledge social, cultural, or economic values regarding the listed species.

As indicated in Section 1.1, NMFS has collaborated with the locally based Lake Ozette Steering Committee to develop this recovery plan. NMFS will continue to support local recovery planning in the Lake Ozette watershed. The recovery goal for Lake Ozette sockeye salmon (*Oncorhynchus nerka*) is founded on a belief that citizens and the treaty tribes in the region value the substantial ecological, cultural, social, and economic benefits that are derived from having healthy, diverse populations of sockeye salmon.

The following sections describe ESA requirements, broad-sense goals, and the more specific goals, biological criteria, and threats-based criteria NMFS will use to remove the species from the Federal list of endangered and threatened species.

3.1 ESA REQUIREMENTS

For NMFS to formally approve an ESA recovery plan, it must meet certain statutory requirements specified in ESA sections 4(a)(1) and 4(f)(1)(B):

- ESA section 4(a)(1) lists factors to be considered for listing, re-classification, or delisting of a species; these factors are to be addressed in recovery plans:

  A. The present or threatened destruction, modification, or curtailment of [the species'] habitat or range
  B. Over-utilization for commercial, recreational, scientific, or educational purposes
  C. Disease or predation
  D. The inadequacy of existing regulatory mechanisms
  E. Other natural or manmade factors affecting [the species'] continued existence

- Further, ESA section 4(f)(1)(B) directs that "Each plan must include, to the maximum extent practicable,

  "(i) a description of such site-specific management actions as may be necessary to achieve the plan's goals for the conservation and survival of the species;

> (ii) objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list; and,
>
> (iii) estimates of the time required and cost to carry out those measures needed to achieve the Plan's goal and to achieve intermediate steps toward that goal."

In addition, it is important for the plans to provide the public and decision-makers with a clear understanding of the goals and scientifically supported strategies needed to recover a listed species (NMFS 2006a).

3.2 RECOVERY GOALS

Recovery of the Lake Ozette sockeye ESU will require actions that conserve, preserve, restore, and enhance ecosystem processes and dynamics in the watershed and adjacent nearshore environment. Actions addressing instream and in-lake processes and conditions, riparian habitat diversity and complexity, and upland watershed health need to be applied in concert with complementary management of harvest and hatcheries. Recovery is a process that leads to a naturally self-sustaining sockeye population that not only exhibits the characteristics of viability, but also provides a harvestable surplus for the treaty tribes and citizens of the region.

Olympic National Park manages Lake Ozette, its lakeshore, and portions of the Ozette River watershed under the guiding principles of the Park Services' Organic Act of 1916. This Act requires the Park administration to conserve the Park's scenery, natural resources, and wildlife for the enjoyment of current and future generations. These far reaching goals are implemented through the Park's General Management Plan, which is another important tool to help achieve the recovery goals for Lake Ozette sockeye salmon (see Section 7.2.1.5).

3.2.1 Broad-Sense Recovery Goals

The following is a vision statement crafted by NMFS and the Lake Ozette Steering Committee for future conditions for the Lake Ozette sockeye ESU and its human and biological setting: *The naturally spawning Lake Ozette sockeye population is sufficiently abundant, productive, and diverse (in terms of life histories and geographic distribution) to provide significant ecological, cultural, social, and economic benefits. Protection and restoration of ecosystems have sustained processes necessary to maintain sockeye as well as other salmon, steelhead, cutthroat trout, and other native fish and wildlife species. Community livability, economic well-being, and treaty-reserved fishing rights have benefited by balancing salmon recovery with management of local forest and fishery economies.*

After the proposed plan has gone through a public comment period and NMFS has approved a final plan, the groups involved in voluntarily implementing the plan's recommendations may consider this vision statement and accept, reject or modify it as they wish.

3.2.2 Objectives

The Lake Ozette Sockeye Recovery Plan sets the following broad objectives to be reached by the year 2050:

1. The Lake Ozette sockeye population is viable;[2]

2. Lake Ozette sockeye use habitats throughout their historical range;

3. The extant population of Lake Ozette sockeye is capable of contributing ecological, social, cultural, and economic benefits on a regular and sustainable basis;

4. Landowners and resource managers have the tools for appropriate land and water resource management to alleviate liability for actions that might otherwise invoke penalties under the ESA;

5. Out-of-basin limiting factors have been addressed equitably and in concert with in-basin limiting factors; and

6. Landowners, land managers and agencies are provided with guidance and implementation resources on the protection and management of habitats to promote and maintain the recovery of Lake Ozette sockeye salmon.

3.2.3 Processes Needed to Accomplish Goals and Objectives

1. Collaborative management processes and approaches, including both volunteer and incentive-based programs, encourage protection and restoration of habitat.

2. Management actions are based on a strategic priority framework, linked, in turn, to an adaptive management program, that recognizes the importance of protection, enhancement, and restoration throughout the life cycle of the species.

[2] A **viable** salmonid population is defined as an independent, naturally self-sustaining population that has less than a five percent risk of extinction due to threats from demographic variation, local environmental variation, and genetic diversity changes over a 100-year period. A population that depends upon naturally spawning hatchery fish for its survival is not viable (McElhany et al. 2000).

3. Agencies and residents employ a diversity of management approaches across the ESU that meet both social and biological objectives.

4. Landowners and resource managers are provided with information and assistance on how to accomplish recovery goals and objectives.

5. An integrated adaptive management program is in place that includes research, monitoring, and evaluation to facilitate periodic assessments of implementation effectiveness, population status, and habitat status, and to advise the need, if any, to modify future recovery management actions.

3.3 OBJECTIVE, MEASURABLE CRITERIA

Evaluating a species for potential delisting requires an explicit analysis of population or demographic parameters (the biological criteria) and also of threats under the five ESA listing factors in ESA section 4(a)(1) (listing factor [threats] criteria). Together these make up the "objective, measurable criteria" required under section 4(f)(1)(B). This section summarizes the biological criteria and threats criteria for the Lake Ozette sockeye.

The TRTs appointed by NMFS define criteria to assess biological viability for each listed species. NMFS develops criteria to assess progress toward alleviating the relevant threats. NMFS Northwest Region may adopt or modify the TRT's viability criteria as the biological criteria for a recovery plan, based on best available scientific information and other considerations as appropriate. For the Lake Ozette Sockeye Recovery Plan, NMFS will use the biological criteria identified by the PSTRT (Currens et al. 2006; Rawson et al. 2008).

As the recovery plan is implemented, additional information will become available along with new scientific analyses that can increase certainty about whether the threats have been abated, whether improvements in population status have occurred for sockeye salmon, and whether linkages between threats and changes in salmon status are understood. NMFS will assess these recovery criteria and the factors for delisting through the adaptive management program for the plan, and NMFS will thoroughly review the criteria at the 5- and 10-year status review of the ESU.

3.3.1 Biological Viability Criteria

All the TRTs use the same biological principles for developing their ESU and population viability criteria. These principles are described in a NMFS technical memorandum, *Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units* (McElhany et al. 2000). Viable salmonid populations (VSP) are described in terms of four parameters: abundance, productivity or growth rate, spatial structure, and diversity. While the ESU is the listed entity under the ESA, the ESU-level viability criteria are

based on the collective viability of the individual populations that make up the ESU—their characteristics and their distribution throughout the ESU's geographic range. The population viability criteria are expressed in terms of risk of extinction over a 100-year time frame.

The first task for the TRTs is to identify the populations that make up an ESU. The PSTRT concluded that the Lake Ozette sockeye salmon ESU was historically made up of only one independent population, as it is today (Currens et al. 2006). The extant spawning aggregations located on two beaches in Lake Ozette and in two tributaries to Lake Ozette are considered subpopulations (Currens et al. 2006).

The second task is to consider the available data and construct criteria to describe both the current status of the population and the characteristics it would need to have to be considered "healthy," viable, or recovered. The PSTRT defined population viability criteria for the Lake Ozette sockeye salmon ESU as follows (Rawson et al. 2008).

Abundance: A population will have a low risk of extinction if it has sufficient abundance from naturally produced spawners to survive environmental variation observed in the past and expected in the future, to be resilient to environmental and anthropogenic disturbances, to maintain genetic diversity, and to support or provide ecosystem functions. To define abundance criteria for the Lake Ozette sockeye population, the PSTRT combined two methods of analysis: (1) population viability analysis (PVA), which combines population census data with simple models of population dynamics to estimate extinction probabilities for the population; and (2) estimates of habitat capacity – food resources and necessary environmental characteristics for all relevant life stages. For the PVA, they used estimates of the number of adult sockeye entering Lake Ozette based on census data for the years 1977-2003, compiled by Haggerty et al. (2007), and additional data for 2004-2006 provided by the Makah Tribe. Because of the relative scarcity of historical data for Lake Ozette sockeye, the PSTRT also used data from Lake Quinault sockeye salmon to make the analysis more robust.

For the estimates of habitat capacity, they drew on multiple studies, including habitat inventories, summarized in Haggerty et al. 2007 and Appendix B of this plan. By all accounts, Lake Ozette is a rich environment for both juvenile and adult salmon, and sockeye are not limited by food availability or competition. Spawner capacity for known beach spawning locations and potential tributary spawning areas was estimated based on habitat surveys.

Because of the uncertainties in the available data, the PSTRT provided a "planning range" for abundance, with upper and lower bounds, rather than a point estimate. This planning range is based on the assumption of at least 1:1 spawner/adult replacement and the assumption that the population maintains and recovers adequate historical spatial structure and diversity, i.e., that spawning takes place throughout the spawning range of the population (which is also the ESU).

Based on currently available information, a viable sockeye population in Lake Ozette will range in abundance between 35,500 and 121,000 adult spawners over a number of years (Rawson et al. 2008).

The minimum abundance number in this range is derived through the PSTRT's PVA analysis for a 5 percent risk of extinction using a 30-year dataset of Lake Ozette sockeye estimated abundance. The upper end of the viability planning range is determined by the minimum of the upper range of three habitat capacity estimates. In accordance with PSTRT decision rules, the upper end of the range is the spawner capacity estimate of 121,000 spawners. The PSTRT cautions that the spawning capacity of 121,000 is likely an underestimate if all potential beach and tributary sites were taken into consideration, not just the ones currently being used.

The PSTRT's planning range is associated with a productivity of 1:1 recruits:spawner. A viable combination of abundance and productivity can be described along a curve. As population productivity increases, the necessary abundance for a viable state will be lower. NMFS has asked the PSTRT to further calculate a more specific abundance and productivity target within the planning range, which, over a specified number of years, would represent a level upon which to base the delisting decision. The PSTRT has agreed to perform additional technical analyses, given policy guidance as to the level of certainty desired for the delisting determination. A more specific target will be included in the final plan.

Productivity: The productivity (growth rate) of a population is a measure of its ability to sustain itself or its ability to rebound from low numbers. Productivity can be measured as naturally produced spawner-to-spawner ratios (returns per spawner, or recruits per spawner), annual population growth rate, or trends in abundance of naturally produced fish. The PSTRT's population viability analysis model assumes that the population growth rate is stable or increasing, and that the population will sustain itself (i.e., not be declining) at the viability abundance level. The PSTRT recommends that the growth rate for Lake Ozette sockeye, once viability is achieved, should average 1. Until the ESU achieves viability, the growth rate must be greater than 1 (Rawson et al. 2008).

Spatial structure: Spatial structure concerns the geographic distribution of a population in habitats it uses throughout its life cycle, and the processes that affect the distribution. Populations with restricted distributions and few spawning areas are at a higher risk of extinction as a result of catastrophic environmental events (e.g., a single landslide) than populations with more widespread and complex spatial structures. A population with complex spatial structure will include multiple spawning areas and will allow the expression of natural patterns of gene flow.

Because of the contrasting benefits of groups of individuals being close enough together for re-colonization to occur and yet spread out enough so that all groups do not fall victim to the same catastrophe, spatial structure for a viable population should include multiple clusters of groups that are closely aggregated, with the clusters themselves being spread out throughout the geographic area occupied by the population (Rawson et al. 2008).

The PSTRT noted that the current, limited distribution of Lake Ozette sockeye spawners puts the ESU at high risk, and recommends that a viable sockeye population in Lake Ozette should include multiple, spatially distinct and persistent spawning aggregations throughout the historical range of the population. A viable population will therefore contain multiple spawning aggregations along the lake beaches, which are the known historical spawning areas. The certainty that the population achieves a viable condition would be further increased if self-sustaining spawning aggregations in one or more tributaries to the lake were also established.

Diversity: Salmon exhibit considerable diversity within and among populations in their life history, morphological, physiological, and genetic traits. Because environments continually change as a result of natural processes (e.g., fires, floods, drought, and landslides) as well as from anthropogenic influences, populations exhibiting greater diversity are more resilient to both short- and long-term changes. Since salmon regularly face variability in the environments they inhabit, the contributions of diversity to population persistence are critical to consider.

This plan uses the PSTRT's diversity criterion that a viable Ozette sockeye population includes one or more persistent spawning aggregations from each major genetic and life history group historically present within that population (Rawson et al. 2008). The PSTRT notes, however, that there is little information regarding historical diversity for the anadromous Ozette sockeye ESU, and that research is needed on current diversity types, as is a retrospective analysis of the likely historical diversity range. It is known that nearly all of the Lake Ozette beach spawning sockeye return to the lake at age 4 (Haggerty et al. 2007); while there are genetic differences between age cohorts, the age cohorts do not mix (i.e. do not spawn with each other). As a consequence, the population could be more vulnerable to catastrophic events or unfavorable conditions affecting an entire year class. Expanding the distribution of sockeye into different habitats (e.g. historical beach spawning areas and/or tributary spawning) may lead to increasing life history diversity, including changes in age composition, morphology, and behavior.

One form of diversity within the *O. nerka* species in Lake Ozette is the genetic difference between the anadromous sockeye salmon population, which is listed under the ESA, and the resident kokanee salmon, which is not. The genetic differences are large enough that these two groups are different ESUs. The PSTRT indicates that a viable population of sockeye in Lake Ozette would maintain the historical genetic diversity and distinctness between anadromous sockeye salmon and kokanee salmon (Rawson et al. 2008).

3.3.2 Adaptive Management

The PSTRT found that the lack of good historical data (e.g., spawner abundances, distribution over lake beaches and between lake and tributary spawning areas, and life history diversity) was a source of uncertainty in the analysis of viability and risk of extinction for Lake Ozette sockeye. The team strongly recommended improved data

monitoring and research as part of implementing the recovery plan. Then the viability criteria can be reevaluated and, if necessary, revised, as part of adaptive management.

Table 3.1. Summary of proposed Lake Ozette sockeye viability criteria for naturally self-sustaining adults (Source: Rawson et al. 2008)

VSP Parameter	Proposed Criteria
Abundance Planning Range	35,500 – 121,000 spawners, over a number of years
Productivity	Population growth rate stable or increasing
Spatial Structure	Multiple spatially distinct and persistent spawning aggregations across the historical range of the population
Diversity	One or more persistent spawning aggregations from each major genetic and life history group historically present within the population

3.3.3 Listing Factor (Threats) Criteria

Evaluating a species for potential reclassification or delisting requires an explicit analysis of the five ESA listing factors (also called "threats") in addition to evaluation of population or demographic parameters. Listing factors are those features that were evaluated under section 4(a)(1) when the initial determination was made to list the species for ESA protection. Threats are defined as the specific human activities or processes that cause the physical conditions that limit a species' ability to survive. Legal challenges to recovery plans have affirmed the need to frame recovery criteria in terms of threats as assessed under the five listing factors. The listing factors described in section 4(a)(1) of the ESA are as follows:

> A. The present or threatened destruction, modification, or curtailment of [the species'] habitat or range
> B. Over-utilization for commercial, recreational, scientific or educational purposes
> C. Disease or predation
> D. The inadequacy of existing regulatory mechanisms
> E. Other natural or manmade factors affecting [the species'] continued existence

At the time of a delisting decision, NMFS will examine whether the section 4(a)(1) listing factors have been addressed, such that delisting is not likely to result in re-

emergence of the threats. It is possible that current perceived threats will become insignificant in the future as a result of changes in the natural environment or changes in the way threats affect the entire life cycle of salmon and steelhead. Consequently, NMFS expects that the ranking of threats may change over time and that new threats may be identified. Establishing criteria for each of the relevant listing/delisting factors helps to ensure that underlying causes of decline have been addressed and mitigated prior to considering a species for delisting. During its periodic status reviews, NMFS will evaluate and review the listing factor criteria under conditions at the time to determine how actions implemented to improve upon listing factors have affected VSP characteristics for the naturally produced components of the Lake Ozette sockeye salmon population.

NMFS expects that if the Lake Ozette Sockeye Recovery Plan's proposed actions to address the threats and limiting factors are implemented, they will have a high likelihood of meeting the listing factor (threats) criteria specified in this section.

Each of the threats criteria described below is related to one or more of the major factors limiting recovery described in the plan and listed in NMFS' 2006 Report to Congress on the Pacific Coastal Salmon Recovery Fund (PCSRF) for Lake Ozette sockeye salmon, i.e., (1) riparian area degradation and loss of in-river large woody debris; (2) degraded tributaries/river/lake habitat conditions; (3) excessive sediment in spawning gravels; and (4) predation on adults by otters and seals (MFM 2000; NMFS 2003; NMFS 2006b– http://www.nwr.noaa.gov/Salmon-Recovery-Planning/PCSRF/upload/PCSRF-Rpt-2006.pdf).

Factor A: The present or threatened destruction, modification, or curtailment of a species' habitat or range.

To determine that the Lake Ozette sockeye ESU is recovered, threats to habitat should be addressed as outlined below:

1. Forest management practices continue to be implemented under the Washington Department of Natural Resources Habitat Conservation Plan for state forest lands, and under Washington State Forest Practices Rules consistent with the Forest Practices Habitat Conservation Plan on private lands. Forestry management actions are effectively monitored for consistency with HCP regulations, and rules included in the forestry plans are enforced.

2. Agricultural practices are implemented to protect riparian areas, floodplains, and stream channels, and to protect water quality from sediment, pesticide, herbicide, and fertilizer runoff.

3. Rural development, including land use conversion from agriculture and forest land to rural development areas, does not reduce water quality or impair natural stream conditions.

4. Channel function, including vegetated riparian areas, canopy cover, stream-bank stability, off-channel and side-channel habitats, natural substrate and sediment processes, natural hydraulic and hydrologic processes, water quality, and channel complexity is restored to provide adequate migration, rearing and spawning habitat.

5. Limnetic processes are protected and restored so that ecological inputs (of sediment, instream and groundwater flows, insects, leaves and wood) and ecological habitat processes support properly functioning lake and shoreline habitat conditions, which in turn support adequate adult migration, rearing, and spawning habitat for Lake Ozette sockeye salmon and the species they prey upon.

6. Nearshore processes are protected and restored so that ecological inputs (of sediment, instream and groundwater flows, insects, leaves and wood) and ecological habitat processes support properly functioning estuary and nearshore habitat conditions that in turn support Lake Ozette sockeye salmon and the species they prey upon.

7. Technical tools accurately assess the impacts of habitat management actions.

8. Deleterious effects of stormwater runoff are eliminated or controlled so as not to impair water quality and quantity in salmonid streams, lake, or the riparian habitats supporting them.

9. Sufficient instream flow and lake level conditions are achieved to support salmon spawning, rearing, and migration needs and to meet the Lake Ozette sockeye population viability targets.

10. High temperatures no longer pose a threat of lethal or sub-lethal effects, such as decreased embryo viability, impaired life cycle performance of offspring, and decreases in survival and productivity of adult migrants exposed to high temperatures in Lake Ozette and the Ozette River.

For additional information on threats related to habitat degradation and loss, see Chapter 4 of the plan and the 2006 PCSRF Report to Congress (NMFS 2006b).

Factor B: Overutilization for commercial, recreational, or educational purposes. To determine that Lake Ozette sockeye salmon are recovered, any utilization for commercial, recreational, scientific, or educational purposes should be addressed as outlined below:

1. Fishery management plans for Lake Ozette sockeye are in place that (a) accurately account for total fishery mortality (i.e., both landed catch and non-landed mortalities) and constrain mortality rates to levels that are consistent with achieving ESU viability (i.e., provide for adequate spawning escapement given intrinsic productivity for both beach and tributary spawning sockeye); and (b) are

implemented so that any effects on the abundance, productivity, diversity, and spatial structure of the population are consistent with the recovery of the ESU.

2. Compliance with fishery management rules and regulations is effectively monitored and enforced.

3. Technical tools accurately assess the potential impacts of fishery management actions.

For additional information on threats related to harvest actions, see Chapter 4 of the plan.

Factor C: Disease or predation. To determine that the ESU is recovered, any disease or predation that threatens its continued existence should be addressed as outlined below:

1. Hatchery operations apply measures that reduce the risk that natural Lake Ozette sockeye salmon are adversely affected by fish diseases and parasites.

2. Suitable methods and levels of marine mammal and river otter control are identified and implemented to mitigate negative interactions with sockeye where predation poses significant risks to recovery. Measures taken must be consistent with NPS, Marine Mammal Protection Act, and National Marine Sanctuary laws and policies, where applicable.

3. Populations of introduced and native predator species (e.g., cutthroat trout, sculpin, northern pikeminnow, and largemouth bass) are managed such that competition or predation with Lake Ozette sockeye salmon does not impede recovery.

For additional information on current threats resulting from disease or predation, see Chapter 4 of the plan.

Factor D: The inadequacy of existing regulatory mechanisms. To determine that Lake Ozette sockeye salmon are recovered, any inadequacy of existing regulatory mechanisms that threatens its continued existence should be addressed as outlined below:

1. Regulatory mechanisms are in place to ensure that any effects on the abundance, productivity, diversity, and spatial structure of populations are consistent with the recovery of the ESU.

2. Technical tools accurately assess the potential impacts of regulatory actions.

3. Rules and regulations for habitat management, protection, and restoration (e.g., the FPHCP) are effectively enforced.

4. Habitat conditions, watershed functions, riparian corridors, and nearshore processes are conserved and protected through land-use planning that guides population growth and rural development.

5. Habitat conditions and watershed function are protected and restored through regulations that govern resource extraction such as timber harvest.

6. Adequate resources, priorities, regulatory frameworks, and coordination mechanisms are established and/or maintained for the effective management of fisheries and for effective enforcement of land and water use regulations that protect and restore habitats and marine and freshwater bodies.

7. Habitat conditions and watershed functions are protected through land acquisition or easements from willing landowners as appropriate where existing policy or regulation does not provide adequate protection.

8. Adequate Washington Department of Ecology regulatory mechanisms protect water quality and restrict stormwater runoff.

For additional information on existing regulatory mechanisms, see Section 7.2.1 of the plan.

Factor E: Other natural or man-made factors affecting continued existence.
To determine that Lake Ozette sockeye salmon are recovered, other natural and man-made threats to its continued existence should be addressed as outlined below:

1. Hatchery management plans are in place to ensure that any effects on the abundance, productivity, diversity, and spatial structure of the population are consistent with the recovery of the ESU.

2. Integrated adaptive management that includes monitoring, evaluation, and research programs is implemented to assess the potential impacts of hatchery, habitat, and harvest management actions.

3. Hatcheries operate using appropriate ecological, genetic, and demographic risk containment measures for (1) hatchery-origin adults returning to natural spawning areas, (2) release of hatchery juveniles, (3) handling of natural-origin adults at hatchery facilities, (4) withdrawal of water for hatchery use, (5) discharge of hatchery effluent, and (5) maintenance of fish health during sockeye salmon propagation in the hatchery.

4. Rules and regulations for hatchery fish management and protection are effectively enforced.

5. Ecological functions of salmon, including their benefits in cycling ocean-derived nutrients into freshwater lake, estuarine, and nearshore areas are considered in developing and implementing fishery, hatchery, and habitat management actions.

6. All hatchery-origin juvenile Lake Ozette sockeye salmon are marked to differentiate them from natural-origin Lake Ozette sockeye, enabling assessments of hatchery and wild sockeye production levels through sampling of fisheries, migratory areas, and adult returns to hatcheries and natural spawning areas.

7. Mechanisms are in place to reduce the incidence of, and impacts from, introduced, invasive, or exotic species.

3.4 DELISTING DECISIONS

NMFS concludes that the biological (Section 3.3.1) and listing factor (threats) criteria (Section 3.3.3), when taken together, describe conditions, commitments, and administrative measures that, when met, would result in a determination that the species is not likely to become endangered within the foreseeable future throughout all or a significant portion of its range. The criteria should exceed the minimum necessary to delist the ESU. In accordance with its responsibilities under section 4(c)(2) of the Act, NMFS will conduct status reviews of Lake Ozette sockeye salmon at least once every five years to evaluate the status of the ESU and determine whether it should be removed from the list or changed in status. Such evaluations will take into account the following:

- The biological criteria (Rawson et al. 2008 and Currens et al. 2006) and listing factor (threats) criteria described above and as amended through the research, monitoring, evaluation, and adaptive management processes included in this plan. The TRT has provided biological viability criteria that include a planning range for abundance. NMFS has asked the PSTRT to further calculate a more specific abundance and productivity target within this range, which, over a specified number of years, would represent a level upon which to base the delisting decision. A more specific target will be included in the final plan.

- The management programs in place to address the threats.

- Principles presented in the Viable Salmonid Populations paper (McElhany et al. 2000).

- Best available information on ESU status and new advances in risk evaluation methodologies.

- Other considerations, including: the distribution of spawning aggregations; the diversity of life history and phenotypes expressed; the function and ecological diversity of occupiable habitat types relative to those available to the historical population, and considerations regarding catastrophic risk.

3.5 MODIFYING OR UPDATING THE RECOVERY PLAN

The ESA requires a review of all listed species at least once every five years. Guidance for these reviews developed jointly by NMFS and the U.S. Fish and Wildlife Service is on the NMFS website: http://www.nmfs.noaa.gov/pr/pdfs/laws/guidance_5_year_review.pdf. According to NMFS Interim Endangered and Threatened Species Recovery Planning Guidance (NMFS Recovery Guidance) (NMFS 2006a), immediately following the five-year species review, an approved recovery plan should be reviewed in conjunction with implementation monitoring, to determine whether or not the plan needs to be brought up to date.

NMFS Recovery Guidance provides three types of plan modifications: 1) an update; 2) a revision; or 3) an addendum. An update involves relatively minor changes. An update may identify specific actions that have been initiated since the plan was completed, as well as changes in species status or background information that do not alter the overall direction of the recovery effort. An update does not suffice if substantive changes are being made in the recovery criteria or if any changes in the recovery strategy, criteria, or actions indicate a shift in the overall direction of recovery; in this case, a revision would be required. Updates can be made by the Salmon Recovery Division, which will seek input from the local stakeholder group prior to making any update. An update would not require a public review and comment period.

NMFS expects that updates will result from implementation of the adaptive management program for this plan. Adaptive management depends on the flow of information from field staff to recovery managers and planners; hence it requires frequent updates from monitoring and research on the effectiveness of recovery actions and the status and trends of the listed species. It may be most efficient to keep the recovery plan current by updating it frequently enough to forego the need for major revisions.

A revision is a substantial rewrite and is usually required if major changes are required in the recovery strategy, objectives, criteria, or actions. A revision may also be required if new threats to the species are identified, when research identifies new life history traits or threats that have significant recovery ramifications, or when the current plan is not achieving its objectives. Revisions represent a major change to the recovery plan and must include a public review and comment period.

An addendum can be added to a recovery plan after the plan has been approved and can accommodate minor information updates or relatively simple additions such as implementation strategies or participation plans, by approval of the field office or Regional Administrator. More significant addenda—adding a species to a recovery plan, for example—should undergo public review and comment before being attached to a plan. Addenda are approved on a case by case basis because of the wide range of significance of different types of addenda.